

IN THE CLAIMS:

1. (Currently Amended) A method, comprising:
providing a device having a dielectric layer;
applying a plurality of constant voltage pulses to said device; and
determining a time-to-breakdown for said dielectric layer based upon a count of the
number of pulses applied to said device to break down ~~until~~ said dielectric layer
~~breaks down~~.
2. (Original) The method of claim 1, further comprising measuring a current
through said dielectric layer after one or more of said constant voltage pulses has been applied.
3. (Original) The method of claim 1, further comprising measuring a current
through said dielectric layer after each of said plurality of constant voltage pulses has been
applied.
4. (Original) The method of claim 1, wherein said time-to-breakdown is determined
based upon a measurement of current flowing through said dielectric layer, said current being
measured after one or more of said constant voltage pulses has been applied.
5. (Original) The method of claim 1, wherein said device is comprised of at least
one of a transistor, a capacitor, a resistor and a memory cell.

6. (Original) The method of claim 1, wherein said dielectric layer is comprised of silicon dioxide or a material having a dielectric constant greater than 5.

7. (Original) The method of claim 1, wherein said constant voltage pulses have a voltage that ranges from approximately 4-5 volts.

8. (Original) The method of claim 1, wherein said pulses have a constant pulse width.

9. (Original) The method of claim 1, wherein said pulses have a constant pulse width of less than 1 μ sec.

10. (Original) The method of claim 1, wherein said pulses have a constant pulse width of approximately 100 ns.

11. (Original) The method of claim 2 or 3, wherein said step of measuring said current through said dielectric layer is performed using an applied voltage of approximately 1-2 volts.

12. (Original) The method of claim 1, wherein said device is a transistor and said dielectric layer is a gate insulation layer for said transistor.

13. (Original) The method of claim 1, wherein said dielectric layer is an interlevel or intralevel dielectric layer of a conductive interconnection structure.

14. (Original) The method of claim 1, further comprising:
determining at least one parameter of a process operation to be performed to form a
dielectric layer on at least one subsequently processed substrate based upon said
determined time-to-breakdown.
15. (Original) The method of claim 14, further comprising:
performing said process operation comprised of said determined at least one parameter on
said at least one subsequently processed substrate to form said dielectric layer
above said at least one subsequently processed substrate.
16. (Original) The method of claim 14, wherein determining said at least one
parameter comprises determining at least one of a temperature, a pressure, a duration, a process
gas composition, a process gas concentration, and an applied voltage of said at least one process
operation.
17. (Original) The method of claim 14, wherein said at least one process operation
comprises at least one of a deposition process, a thermal growth process and a nitridation
process.
18. (Original) The method of claim 1, wherein said device is part of a test structure
formed on a semiconducting substrate.

19.-76. (Canceled)

77. (Currently Amended) A method, comprising:

providing a device having a dielectric layer, wherein said pulses have a constant pulse width;

applying a plurality of constant voltage pulses to said device;

determining a time-to-breakdown for said dielectric layer based upon a count of the number of pulses applied to said device to break down ~~until~~ said dielectric layer ~~breaks down~~; and

determining at least one parameter of a process operation to be performed to form a dielectric layer on at least one subsequently processed substrate based upon said determined time-to-breakdown.

78. (Previously Presented) The method of claim 77, further comprising:

performing said process operation comprised of said determined at least one parameter on said at least one subsequently processed substrate to form said dielectric layer above said at least one subsequently processed substrate.

79. (Previously Presented) The method of claim 77, wherein determining said at least one parameter comprises determining at least one of a temperature, a pressure, a duration, a process gas composition, a process gas concentration, and an applied voltage of said at least one process operation.

80. (Previously Presented) The method of claim 77, wherein said at least one process operation comprises at least one of a deposition process, a thermal growth process and a nitridation process.

81. (Currently Amended) A method, comprising:
providing a device having a dielectric layer;
applying a plurality of constant voltage pulses to said device, wherein said constant voltage pulses have a voltage that ranges from approximately 4-5 volts;
determining a time-to-breakdown for said dielectric layer based upon a count of the number of pulses applied to said device to break down ~~until~~ said dielectric layer ~~breaks down~~; and
determining at least one parameter of a process operation to be performed to form a dielectric layer on at least one subsequently processed substrate based upon said determined time-to-breakdown.

82. (Previously Presented) The method of claim 81, further comprising:
performing said process operation comprised of said determined at least one parameter on said at least one subsequently processed substrate to form said dielectric layer above said at least one subsequently processed substrate.

83. (Previously Presented) The method of claim 81, wherein determining said at least one parameter comprises determining at least one of a temperature, a pressure, a duration, a process gas composition, a process gas concentration, and an applied voltage of said at least one process operation.

84. (Previously Presented) The method of claim 81, wherein said at least one process operation comprises at least one of a deposition process, a thermal growth process and a nitridation process.